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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/703,631	11/02/2000	Alan F. Graves	1111967ROUS01U	1695
626	7590	12/01/2003	EXAMINER	
NORTEL NETWORKS LIMITED P. O. BOX 3511, STATION C OTTAWA, ON K1Y 4H7 CANADA			LI, SHI K	
			ART UNIT	PAPER NUMBER
			2633	

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Please find below and/or attached an Office communication concerning this application or proceeding.

AIR MAIL

Office Action Summary

Application No.

09/703,631

Applicant(s)

GRAVES, ALAN F.

Examiner

Shi K. Li

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 36 is/are allowed.
- 6) ☒ Claim(s) 1-35 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: Lines 6-12 on page 1 recite cross references. The status of the related applications have been changed and they no longer co-pending.

Appropriate correction is required.

Claim Objections

Claim 37 is objected to because of the following informalities: Claim 37 recites the limitation "the first output is connected to the second output" in line 13 of the claim. There may be a typo. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 32 and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 32 recites the limitation "the optical plane switch" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

5. Claim 37 recites the limitation "the second " in line 20 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 37 recites the limitation "the plurality of optical switching matrices" in lines 17 and 28-29 of the claim. There is insufficient antecedent basis for this limitation in the claim

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 2-5, 7, 9, 12, 17 and 27-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Shiragaki (U.S. Patent 5,457,556).

Shiragaki discloses in FIG. 2 an optical switching system. FIG. 1 comprises a space switch 10 for switching a group of channels, a wavelength switch 13 for switching optical channels, a plurality of wavelength division demultiplexers 12-1 and 12-2, and a plurality of wavelength division multiplexers 14-1 and 14-2.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiragaki (U.S. Patent 5,457,556) in view of Fatehi et al. (U.S. Patent 6,192,172 B1).

Shiragaki discloses in FIG. 2 a switching system. FIG. 1 comprises a space switch 10, a wavelength switch 13, a plurality of wavelength division demultiplexers 12-1 and 12-2, and a plurality of wavelength division multiplexers 14-1 and 14-2. Space switch 10 corresponding to

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the first optical switching matrix of the instant claim. The difference between Shiragaki and the claimed invention is that Shiragaki only has one wavelength switch while the claimed invention has a plurality of switching matrices. Fatehi et al. teaches in col. 4, lines 31-35 and FIG. 3 that a large-scale switch can be realized using a plurality of conventional optical WSCX. In fact, the switch 13 of Shiragaki consists of a plurality of smaller switches because a particular input port can only be switched to an output port with the same wavelength group. One of ordinary skill in the art would have been motivated to combine the teaching of Fatehi et al. with the switching system of Shiragaki because using a plurality of small WSXCs is more reliable and more cost effective than using a large complex switch. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a plurality of small switches, as taught by Fatehi, to replace the large switch of Shiragaki in the switching system of Shiragaki because using a plurality of small WSXCs is more reliable and more cost effective than using a large complex switch.

10. Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiragaki (U.S. Patent 5,457,556) in view of Tai et al. (U.S. Patent 6,341,040 B1).

Shiragaki has been discussed above in regard to claims 2-5, 7, 9, 12, 17 and 27-28. The difference between Shiragaki and the claimed invention is that Shiragaki does not teach the use of interleaver/deinterleaver in the multiplexer/demultiplexer. Tai et al. teaches in FIG. 10 that interleaver and deinterleaver can be used in multiplexer and demultiplexer to increase the spacing between adjacent channels and simplify the task of separating channels. One of ordinary skill in the art would have been motivated to combine the teaching of Tai et al. with the switching system of Shiragaki because interleaver and deinterleaver have better filter

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characteristics for separating and combining WDM channels with small spacing. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include interleave and deinterleaver in the multiplexer and demultiplexer, as taught by Tai et al., in the switching system of Shiragaki because interleaver and deinterleaver have better filter characteristics for separating and combining WDM channels with small spacing.

11. Claims 10-11, 13-16 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiragaki (U.S. Patent 5,457,556) in view of Kuwano (H. Kuwano, "MEMS for Telecommunication Systems", Seventh International Symposium on Micro Machine and Human Science, IEEE 1996) and Marxer et al. (C. Marxer, "MEMS for Applications in Fiber Optic Communication", IEEE 1998).

Shiragaki has been discussed above in regard to claims 2-5, 7, 9, 12, 17 and 27-28. The difference between Shiragaki and the claimed invention is that Shiragaki does not teach the use of MEMS. Marxer et al. teaches in FIG. 2 a four-port MEMS and Kuwano teaches in FIG. 2 a six-port MEMS. It is clear from Table 2 of Marxer et al. that MEMS switches are fast, low loss with little crosstalk. One of ordinary skill in the art would have been motivated to combine the teaching of Marxer et al. and Kuwano with the switching system of Shiragaki because MEMS switches are small and have desirable optical characteristics. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use MEMS switches, as taught by Marxer et al. and Kuwano, in the switching system of Shiragaki because MEMS switches are small and have desirable optical characteristics.

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12. Claims 17-24 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiragaki (U.S. Patent 5,457,556) in view of Morthier (European Patent Application EP 1,030,481 A1).

Shiragaki discloses in FIG. 2 an optical switching system. FIG. 1 comprises a space switch 10 for switching a at the fiber layer, a wavelength switch 13 for switching optical channels, a plurality of wavelength division demultiplexers 12-1 and 12-2, and a plurality of wavelength division multiplexers 14-1 and 14-2. The difference between Shiragaki and the claimed invention is that Shiragaki has two layers and the claimed invention has three layers. Shiragaki also discloses in FIG. 9 a three-layer switching system. However, the last layer of FIG. 9 is time switching in electrical domain. Morthier teaches in FIGs. 4-12 and col. 3, lines 15-55 that a switching system can be simplified by switching groups of channels. One of ordinary skill in the art would have been motivated to combine the teaching of Morthier with the switching system of Shiragaki to modify FIG. 2 or FIG. 9 of Shiragaki to include a layer for group switching because the approach simplifies the switching fabric and reduces the cost. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a layer for switching groups of channels, as taught by Morthier, in the switching system of Shiragaki because the approach simplifies the switching fabric and reduces the cost.

13. Claims 25-26 and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiragaki (U.S. Patent 5,457,556) in view of Fatehi et al. (U.S. Patent 6,192,172 B1).

Shiragaki has been discussed above in regard to claims 2-5, 7, 9, 12, 17 and 27-28. The difference between Shiragaki and the claimed invention is that Shiragaki does not teach inclusion of optical amplifier for compensation for losses. Fatehi et al. teaches in col. 9, lines 34-36 the

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use of optical amplifier for compensating losses. One of ordinary skill in the art would have been motivated to combine the teaching of Fatehi et al. with the switching system of Shiragaki because compensating losses with optical amplifier equalizes the intensity level of all the channels in a WDM system and improves the quality of the signal. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use optical amplifiers to compensate losses, as taught by Fatehi et al., in the switching system of Shiragaki because compensating losses with optical amplifier equalizes the intensity level of all the channels in a WDM system and improves the quality of the signal.

14. Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiragaki (U.S. Patent 5,457,556) in view of Fatehi et al. (U.S. Patent 6,192,172 B1).

Shiragaki has been discussed above in regard to claims 2-5, 7, 9, 12, 17 and 27-28. The difference between Shiragaki and the claimed invention is that Shiragaki does not teach a plurality of optical switches for the first layer. Fatehi et al. teaches in col. 4, lines 31-35 and FIG. 3 that a large-scale switch can be realized using a plurality of conventional optical WSCX. In fact, the switch 13 of Shiragaki consists of a plurality of smaller switches because a particular input port can only be switched to an output port with the same wavelength group. One of ordinary skill in the art would have been motivated to combine the teaching of Fatehi et al. with the switching system of Shiragaki because using a plurality of small WSXCs is more reliable and more cost effective than using a large complex switch. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a plurality of small switches, as taught by Fatehi, to replace the large switch of Shiragaki in the switching system of Shiragaki

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because using a plurality of small WSXCs is more reliable and more cost effective than using a large complex switch.

Allowable Subject Matter

15. Claim 36 is allowed.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 703 305-4341. The examiner can normally be reached on Monday-Friday (8:30 a.m. - 5:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703 305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-3900.

skl


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